UNIVERSITY OF GONDAR

COLLEGE OF NATURAL AND COMPUTATIONAL SCIENCES

DEPARTMENT OF APPLID MICRO BIOLOGY

EVALUATION OF ANTAGONIST FUNGI FOR THE BIOLOGICAL CONTROL OF *EICHHORNIA CRASSIPES* FROM LAKE TANA

A thesis submitted to the Department of Biology, College of Natural and Computational Sciences, University of Gondar in partial fulfillment of the requirements for the degree of Master of Sciences in Applied Microbiology.

BY: Erehemet Belete

ADVISOR: Dr. Samuel Sahile (BSc, MSc., PhD)

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Full title of the research project	Evaluation of antagonist fungi for the biological control of *Eichhornia crassipes* in lake Tana.

Advisor's Name	Signature	Date
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Examiner's Name	Signature	Date
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Declaration

I, the undersigned, declare that this scientific research thesis is my own original work. We agree to accept responsibility for the scientific ethical and technical conduct of the research and for the provision of required progress reports as per terms and conditions of the Research. All sources of materials and ideas for this proposal has been duly acknowledged.

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LIST OF ABBREVITIONS

IUCNS International Union for Conservation of nature

PDA Potato Dextrose Agar

GEF Global Environment Facility

DI Disease Incidence

DS Disease Severity

EEFRI Ethiopian Environmental and Forest research institute

DAS Development Actors

MEA Malt Extract Agar

NB Nutrient Broth

MEB Malt Extract Broth

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ABSTRACT

Water Hyacinth (*Eichhornia crassipes* Martius) is a freshwater aquatic plant, belonging to the family Pontederiaceae and is a native of Brazil and Ecuador region. Water hyacinth often invades bodies of water that have been impacted by human activities. The aims of this study was to isolate, screen and rank fungi infecting water hyacinth plants on the basis of their pathogen city and ability to cause damage, and to test the potential of highly pathogenic species as a bio control agents. The experimental design was laboratory based experiment. Samples for characterization and isolation of pathogenic species of fungi, infected parts (leaf and petiole) were collected from the area, in clean plastic bags, and stored in a refrigerator at 4^0 C. Samples were randomly selected from Lake Tana specifically Lemba, Gorgora and from the soil in microbiology laboratory. Different fungal antagonistic species were isolated from surface sterilized *Eichornia crassipes* parts with pronounced blight syndrome. The most common species were characterized, identified and tested. A total of 12 fungi isolates potentially suspected to be biocontrols these are, *Tricothecum roseum, Trichoderma* spp1and 2, *Rhizoctonia* spp, *coletricum germinal, Fusarium* spp, *Scieroticum* spp, *Rhizoctonia botaticola, Alternaria solani, Aspergillus flaves, Aspergillus niger* and *Botrytus fabae.* From detached leaf test based on the width of the lesion, the isolated species were divided into highly pathogenic, pathogenic and non-pathogenic. Of these species only highly pathogenic species were used for whole plant photogenic test. The disease incidence (DI) was taken as the percentage number of leaves on the plant that exhibited disease symptoms. The highest DI was recorded in *Rhizoctonia* spp(66%)secondly *Ticothecium roseum*(50.7%) followed by *Aspergillus flaves*(49.1%) *Fusarium* spp(43.3%) and *Aspergillus niger*(42.6%). Disease severity (DS) was assessed using the numerical rating scale. Of these species only *Rhizoctonia* spp (100%) and F*usarium* spp (78.6%) showed high disease severity. These fungi were associated with a high percentage of tissue death after five weeks application. *Aspergillus flaves, Tricothecum roseum* and *Aspergillus niger*r shows high moderate disease severity(58.3%, 56.4% and 53.6%) respectively. This study curves creates another option for the management problem of *Eichhornia crassipes* in lake Tana by the use of pathogenic species as a biocontrol agents.

Key phrases: Biological control**,** pathogens, Disease incidence, Disease severity, Detached leaf test